Progress Update – Year 3

Coalbed Methane Multi-Stakeholder Advisory Committee (MAC) Recommendations

November 2009

Table of Contents

1. Executive Summary i

2. Background 1

3. Progress Highlights 4

4. Non-government MAC II Members' Feedback 20

5. Commitment to Ongoing Responsible CBM Development 25

Acronyms and Glossary of Terms 26

Appendix A 31
MAC II Membership

Appendix B 32
Progress Table

Executive Summary

A Multi-Stakeholder Advisory Committee (MAC) was originally formed in November 2003 as part of a review and consultation initiated by the Department of Energy (DOE) to address public concerns associated with coalbed methane (CBM) development in Alberta. The MAC's Final Report (Final Report), released to the public in May 2006, contained 44 recommendations to improve existing rules and regulations related to CBM development in Alberta and identified areas for further study.

The government did not accept two of the recommendations related to royalties and taxes, leaving 42 recommendations to be addressed. The 42 recommendations covered four main areas:

1) Protecting water resources,
2) Enhancing information and knowledge,
3) Minimizing surface impacts, and
4) Communication and consultation.

While some of these recommendations were specific to CBM, many were related to broader energy development issues, such as potential impacts on land and water. Due to the broad scope of the recommendations, a number of government departments and agencies were involved in this cross-ministry initiative. These included the DOE, the Energy Resources Conservation Board (ERCB), Environment (AENV), Sustainable Resource Development (SRD), and Agriculture and Rural Development.

The MAC II was formed in September 2006 to undertake annual reviews for three years to assess progress on implementation of the recommendations. Over the past three years, MAC II members, that included representation from environmental organizations, landowners, agriculture, local government, the energy industry and provincial government departments, have contributed to the development of the annual progress update reports. Members' insights and knowledge were a critical part of the process and the government acknowledges their efforts and commitment. Through this combined effort, significant progress has been achieved.

As of August 15, 2009, progress has been made on all 42 accepted recommendations in the Final Report, including all nine recommendations that had been identified as early action items. A total of 29 recommendations have now been completed, six are on schedule, six are behind schedule and one was reviewed and not actioned. Several of the outstanding recommendations are scheduled for completion by the end of 2009.

In support of the 42 accepted recommendations, a large number of: reports; new or amended directives; guidelines; processes and best management practices; forums; studies; and monitoring programs, have been completed over the last three years or are currently under development. A list of completed recommendations, reports and other deliverables that address the recommendations are provided in the Progress Highlights section of this report.

In year three of the MAC II review, a new status category, 'addressed under other broader government initiatives' was introduced. The purpose of this status was to recognize that some of the Final Report recommendations which were not specific to CBM (e.g. general energy development and groundwater issues) could better be addressed through other broader cross-ministry initiatives such as the Provincial Energy Strategy, Water for Life, Land-use Framework and Integrated Land Management program (for more detail on these initiatives, see pages 6 and 7). A number of these initiatives commenced after the establishment of the MAC in 2003.

These other broader government initiatives target energy, land, and water issues, and have the resourcing, budget and priority to address the MAC recommendations in these areas. In total, five recommendations are being addressed in this manner (see page 6). Progress on these issues will continue to be reported on the appropriate government website. Progress on outstanding MAC Final Report recommendations will continue to be reported on DOE's website.

It is important to recognize that there has been significant development of CBM in Alberta since the MAC was established in 2003, with approximately 19,000 CBM wells being completed, licensed, or tested for CBM over this period. Also, there has been extensive testing of offset water wells, the implementation of enhanced regulatory controls, and the completion of a number of CBM-related reports and studies. All of these activities have greatly increased knowledge and understanding of the resource and the associated risks. Some issues over which there was initial concern have not materialized. For example, very little production of non-saline water has occurred with CBM due to most development to date being in "dry" coals that produce little or no water. Alberta's responsive regulatory framework and policies have helped to ensure that the development of this resource occurs in a responsible manner.

As with previous years, non-government members of the MAC II were provided an opportunity to submit their opinions on the MAC II process through a feedback questionnaire and to provide their input on draft versions of the third annual progress update report. Their feedback has been included in Section 4 of this report. Overall, respondents generally were very satisfied with the MAC II process, believed it helped ensure the accountability of government in carrying out the MAC's recommendations and strongly believed the government had demonstrated its commitment in implementing the recommendations.

Although the MAC II process concludes upon the public release of the third annual progress update report, ongoing work related to the outstanding recommendations and other evolving issues will ensure that CBM in Alberta continues to be developed in a responsible and appropriate manner.

ADDENDUM
Additional Completed Final Report Recommendation

Recommendation 3.4.2
Since this report was reviewed by the MAC II, recommendation #3.4.2 (to investigate whether CBM drilling and completion practices such as using dugout water and untreated river water may affect aquifers) has been completed with the release of ERCB report 2009-C: "Risk to Water Wells of Pathogens in Drilling Fluids". The report can be found on the ERCB website at http://www.ercb.ca. The total number of completed recommendations is now thirty; six are on schedule, five are behind schedule and one was reviewed and not actioned.

Background

Coalbed methane (CBM - also known as natural gas in coal, or natural gas from coal), is natural gas (methane) that is attached (or "adsorbed") to coal seams, rather than trapped in the pore space of rock like most conventional natural gas. It is generally considered a sweet gas, as it does not contain much hydrogen sulphide. Presently, CBM represents about six percent of total natural gas production in Alberta.

The CBM Multi-Stakeholder Advisory Committee

In September 2003, the Department of Energy (DOE) held a pre-consultation with stakeholders to help identify possible issues relating to CBM development. The purpose of DOE's review was to determine if the existing policy and regulations governing CBM development continue to provide a balance between economic benefits and protecting Alberta's water, air, and land resources, and minimizing landowner impacts.

As a direct result of feedback received from the pre-consultation stakeholders, the Coalbed Methane/Natural Gas in Coal Multi-stakeholder Advisory Committee (MAC) was formed in November 2003. The MAC's role was to consult with stakeholders and develop recommendations to ensure that the rules and regulations pertaining to CBM development result in the continued responsible development of CBM.

MAC members represented environmental and agricultural organizations, landowners, local governments, the energy industry, and provincial government departments and agencies. The departments of Agriculture, Food and Rural Development (now Agriculture and Rural Development); Environment (AENV); Sustainable Resource Development (SRD); DOE and the Energy Resources Conservation Board (ERCB, formerly the Energy & Utilities Board) also collaborated in this process.

From the beginning, the MAC wanted to ensure an open and transparent process which included input from stakeholders. Four working groups (surface/air, water, royalty and tenure) with membership from a cross-section of stakeholders were established to provide information and recommendations to the MAC.

Eight information sessions were held in spring 2004 to provide information on CBM, local development, provincial regulations and the consultation process, as well as to create opportunities for members of the public and stakeholder groups to provide input on issues related to CBM development. Feedback was included in the MAC Preliminary Findings which was released for public comment in July 2005. Over 1,000 Albertans participated in the consultation process, either as a member of one of the working groups or as a member of the MAC, through participation at the information sessions or by providing feedback on the Preliminary Findings. Further information about CBM, the consultation process and public update reports is available on the DOE website at http://www.energy.alberta.ca/NaturalGas/561.asp.

The MAC Final Report, released to the public in May 2006, contained 44 recommendations. Some of the recommendations identified issues that were unique to CBM, but many others related to broader energy development. These recommendations are listed in the attached Progress Table (Appendix B).

The MAC II

The MAC II was formed in September 2006 based on MAC recommendation 7.6.1, which called for the formation of a multi-stakeholder group to review progress in addressing the MAC Final Report recommendations. Recommendation 7.6.1 states:

> *As recommendations in this document are implemented, it is recommended a multi-stakeholder committee be established by the Assistant Deputy Ministers Sponsors' Committee to conduct a review with the following components:*
> - *Annual reviews for three years to assess progress according to a monitoring plan.*
> - *A second overall review in three years to assess:*
>   1. *The effectiveness of the recommendations,*
>   2. *New issues or information, and*
>   3. *An assessment as to whether additional recommendations may be needed.*

MAC II stakeholder membership was identical to the MAC, although individual stakeholder representatives differed in some cases. See Appendix A – MAC II membership for a complete list of participating organizations and government departments.

To review and monitor the progress achieved on the recommendations, the MAC II met eight times over the review period: three times during both the first and second years and twice in the third year. At each meeting, an action plan providing status and specific timelines for each recommendation was provided. This action plan was updated on a continual basis. E-mails were used to inform MAC II members of developments between meetings and feedback on the process was obtained both verbally and in writing.

Progress update reports were released as follows:

- First Progress Update Report was released in June 2007 and covered the period May 2006 to March 31, 2007 (the end of the government's fiscal year).
- Second Progress Update Report was released in July 2008 and covered activities over the period April 1, 2007 to March 31, 2008.
- Third Progress Update Report was released in November 2009, and covered the period April 1, 2008 to August 15, 2009.

This third and final report progress update is a result of the MAC II's commitment to keep the public informed and is one component of a number of communications activities being undertaken to inform Albertans about CBM.

Developments since the MAC Final Report

The MAC Final Report recommendations were developed based on the information available at the time of its release. Since that time, industry has gained experience in producing CBM in Alberta and there is a better understanding of the potential development impacts to resources such as water, land, and air.

It is important to recognize that there has been significant development of CBM in Alberta since the MAC was established in 2003, with approximately 19,000 CBM wells being completed, licensed, or tested for CBM over this period. Also, there has been extensive testing of offset water wells, the implementation of enhanced regulatory controls, and the completion of a number of CBM related reports and studies. This has greatly increased knowledge and understanding of the resource and the associated risks.

Some issues over which there was initial concern have not materialized. For example, very little production of non-saline water has occurred with CBM due to most CBM development to date being in "dry" coals in the Horseshoe Canyon coal zone that produce little or no water, or commingled sands and coals production, which do not produce much water.

Some of the outcomes from the MAC Final Report recommendations may differ from what was originally envisioned by the MAC. Reasons for this include: better understanding of the resource; new technologies which enhance production from unconventional gas sources such as CBM; policy and regulatory changes to ensure continued responsible development of CBM; and, ongoing communication with stakeholders through websites, meetings, workshops and other venues to share information on issues related to CBM development.

Since most of the MAC Final Report recommendations are not specific to CBM, there are opportunities to align these recommendations with other broader government processes or reviews. Examples of these include the Provincial Energy Strategy, Water for Life, the Land-use Framework and the Integrated Land Management program.

Progress Highlights

This section provides a high level summary of the key activities undertaken by various government departments, agencies and other groups in addressing issues identified during the MAC consultation process and in response to the MAC Final Report recommendations. Please see Appendix B – Progress Table for a complete list of recommendations, status updates, and activities undertaken.

Of the original 44 MAC recommendations, the government did not accept two of the recommendations related to royalties and taxes. However, it should be noted that in January 2009, the Government of Alberta implemented its new royalty framework. The new royalty framework is based on price and production levels that impact the royalty calculated for low productivity wells such as CBM. As of August 15, 2009, progress has been made on all 42 accepted recommendations in the Final Report, including all nine recommendations identified as early action items. A total of 29 recommendations have now been completed, six are on schedule, six are behind schedule and one was reviewed and not actioned. Several of the outstanding recommendations are scheduled for completion by the end of 2009.

In year three, 14 recommendations were completed and five recommendations were considered to be addressed under other broader government initiatives, bringing the total number of completed recommendations to 29, as follows:

Completed Recommendations

Year of Completion	Description of Recommendation	Recom. #
2006/07	Clarify and communicate the existing rules regarding how much drawdown is allowed during CBM depressurization in a confined, non-saline aquifer to ensure aquifer protection.	3.3.4
2006/07	The Alberta Government should make Crown lessees, freehold owners, and industry aware of the risks and associated impacts of split-title ownership.	6.2.1
2006/07	Create an easy-to-understand public explanation for 'wells per section per pool' as it refers to CBM development.	7.5.3
2006/07	Industry, government, and other stakeholders should work together to develop, document, and implement best practices for CBM operations.	8.1.1
2006/07	The ERCB should continue to take into consideration the timing request of the surface rights holder/leaseholder during critical agricultural periods and not call a hearing at those times.	9.3.1
2007/08	In consultation with stakeholders, the government should consider the use of appropriate fiscal tools to encourage the use of saline water from CBM development to replace non-saline water for enhanced oil recovery and other industrial uses.	5.2.3
2007/08	Review and clarify the criteria for Section 18 Notices of Non-	6.3.1

	Productivity and aggressively serve these notices. Section 18 notices on existing agreements should continue to be subject to deeper rights reversion.	
2007/08	Consider allowing companies an additional one-year continuation under Section 17 of the Petroleum and Natural Gas Tenure Regulation. This additional year would require industry to submit evidence of work conducted during the first continuation period.	6.5.1
2007/08	Review the full range of paper to electronic options of notification and work with local government and other agencies to provide current petroleum and natural gas sales data in a user-friendly format (including map format) to local and/or rural offices such as county offices, agricultural offices, and public libraries.	9.4.1
2007/08	Provide instructions on the government website on the process for conducting an information search by land or by mineral agreement.	9.4.2
2008/09	Develop standard procedures and reporting requirements for sampling, analysis and monitoring water for CBM wells and potentially affected non-saline water wells.	3.3.5
2008/09	Communicate current and future requirements to protect non-saline aquifers.	3.4.1
2008/09	Promote the development or application of new technology to take advantage of saline and marginally saline produced water.	3.5.3
2008/09	Investigate the potential for methane migration or release to water wells as a result of CBM depressurization.	3.6.1
2008/09	Review regulatory processes to support minimal surface disturbance and reduced cumulative impact associated with CBM development.	4.2.1
2008/09	Improve the science and technology for remediation and reclamation of land in sensitive areas that could be impacted by CBM development.	4.3.2
2008/09	The government should facilitate parties coming together to work toward resolution of split-title ownership issues.	6.2.2
2008/09	Review the application processes for intense CBM developments to enhance and promote project-based planning and disclosure.	7.2.1
2008/09	Review all guidelines relating to public input opportunities and notification.	7.3.1
2008/09	Consolidate CBM data in a publicly accessible and user-friendly database.	7.5.2
2008/09	Develop and implement a communication plan to provide better information on CBM issues.	7.5.5
2008/09	Review implementation of the final report recommendations.	7.6.1
2008/09	Review CBM activities in other jurisdictions to ensure Alberta gains the benefit of studies and experience elsewhere.	8.1.2
2008/09	Industry and ERCB should develop and communicate practices and procedures to quickly deal with short-term noise complaints.	9.2.1

The following recommendations are 'addressed under other broader government initiatives'		
2008/09	Review and provide appropriate recommendations to protect the environment and minimize the cumulative impacts from CBM development.	4.3.1
2008/09	Improve coordination of CBM-related application and surveillance processes and develop electronic solutions to facilitate data exchange.	7.4.1
2008/09	Industry and ERCB should increase opportunities for dialogue, education and awareness on possible impacts from CBM development.	7.5.1
2008/09	Government should ensure sufficient resources are available to implement the Final Report recommendations effectively and efficiently.	7.7.1
2008/09	Industry and SRD should continue to consult with each other on minimizing disturbances to wildlife habitat and scheduling activities to address critical wildlife periods.	9.6.1

Work will continue on recommendations that have not yet been completed, and updates will be reported on the DOE (http://www.energy.alberta.ca) and other government websites as appropriate.

Broader government initiatives

In year three of the MAC II, a new status category, 'addressed under other broader government initiatives', was introduced. The purpose of this status was to recognize that some of the Final Report recommendations were not specific to CBM (e.g. general energy development and groundwater issues) and could be better addressed through other cross-ministry initiatives that commenced after the establishment of the MAC, such as the Provincial Energy Strategy, the renewed Water for Life, Land-use Framework and Integrated Land Management program (for more detail on these initiatives, see below).

These other broader government initiatives focus on energy, land, and water issues, and have the resourcing, budget and priority to address the MAC recommendations in this category. In total, five recommendations fall into this category (see above).

Provincial Energy Strategy (PES): In December 2008, the Department of Energy (DOE) announced the PES, which will help chart the course of Alberta's energy future. This strategy is a long-term action plan for Alberta to achieve clean energy production, wise energy use and sustained economic prosperity.

The PES recognizes the potential for unconventional gas, such as CBM, to extend production of natural gas in Alberta well into the future. The potential for production from tight gas and shale gas in Alberta is also significant. The PES identifies the need to find methods to develop and use fossil fuels in an environmentally responsible way, to properly account for cumulative effects to the environment and greenhouse gas emissions, as well as investing in energy infrastructure, including policy development and energy research. These will all have an impact on how

unconventional gas (including CBM) will be developed in Alberta. Further information on the PES can be found on DOE's website at http://www.energy.alberta.ca/Initiatives/strategy.asp.

Land-use Framework (LUF): Announced in December 2008, the LUF is a comprehensive strategy to better manage public and private lands and natural resources to achieve long-term economic, environmental and social goals for the province. The LUF identifies a provincial vision and outcomes for land use on both public and private land. The strategy outlines a regional planning and decision-making framework that reflects provincial goals and priorities and incorporates cumulative effects management.

The LUF considers various ways in which the same land base may be used (e.g., for resource development, recreational purposes and housing) and how the land can be utilized in the most effective way possible. Incorporating land use management and decision-making processes will result in better management of conventional and unconventional gas development. As well, it will balance the needs of various stakeholders by taking into consideration their concerns at the regional land use planning stage. Development of the two top priority regional plans has been initiated with the creation of Regional Advisory Council for both the Lower Athabasca and the South Saskatchewan Plans. Further information can be found on the Government of Alberta website at http://www.landuse.alberta.ca/.

Integrated Land Management (ILM) Program: As mentioned above, Alberta's LUF sets out an approach to manage public and private lands and natural resources to achieve Alberta's long-term economic, environmental and social goals. ILM is an approach to help promote responsible use of provincial public land by influencing land-user behaviour, improving stewardship, and encouraging users of the land to reduce their impact to the land. For example, the ILM Program will ensure meaningful opportunities are available to address the needs and concerns of stakeholders (such as companies, industries, recreationists, environmentalists and the government) before and during resource development. This is one of the elements under the "Efficient Use of Land" strategy in the LUF. Further information on the ILM program can be found on SRD's website at http://www.srd.alberta.ca/lands/usingpublicland/integratedlandmanagement/default.aspx.

Water for Life: The renewed Water for Life strategy, announced in November 2008, confirmed and updated the original strategy, which has guided management of Alberta's water resources since 2003. As with the original strategy, the renewed Water for Life strategy is based on three outcomes: safe, secure drinking water supply; healthy aquatic ecosystems; and reliable, quality water supplies for a sustainable economy. Each outcome will be achieved through knowledge and research, partnerships and water conservation. A key part of Water for Life is the understanding and protection of Alberta's groundwater, which was one of the focuses of the MAC Final Report. The need for improved understanding of Alberta's groundwater resources is emphasized in the renewed strategy. Further information can be found on AENV's website at http://www.waterforlife.alberta.ca/.

Discussion on Outcomes

When the MAC Final Report was released in 2006, four key areas were used to guide and coordinate work, as well as to report on progress:

1) Protecting water resources,
2) Enhancing information and knowledge,
3) Minimizing surface impacts, and
4) Communication and consultation.

A summary of the work completed by government is provided below for each of the key areas. Each summary includes reports and other deliverables (new or amended directives, guidelines, processes and best management practices; forums; studies; and monitoring programs) that have been completed over the last three years or are currently under development. Updates on the status of individual recommendations can be found in Appendix B – Progress Table.

The following discussion summarizes key activities completed for each of the four main areas listed above:

1. Protecting Water Resources

Conventional gas production in the province has typically occurred at depths where only saline water (i.e. water with greater than 4,000 milligrams per litre of total dissolved solids) is encountered, but both conventional and unconventional gas (such as CBM) can occur in shallow zones with non-saline water.

Having a healthy and sustainable water supply is critical for Alberta's environment, communities and economic well-being. At the earliest stages of the consultation, stakeholders identified protection of water resources as one of the key areas of concern.

Part of this concern was based on CBM development in other jurisdictions where the geology and regulatory framework differ from those in Alberta. When the MAC started its review in 2003, there was little data on how CBM development could potentially impact Alberta's water resources, particularly groundwater.

It is important to recognize that the level and type of CBM development anticipated at the beginning of the MAC process has, to date, not occurred. Most CBM production has occurred in the Horseshoe Canyon area which has minimal associated water production. There has been little CBM development in areas where non-saline water may be encountered, such as in the shallow Ardley coal zone in parts of west-central Alberta.

1.1 Objectives

In order to ensure water resources and, in particular, groundwater, would be appropriately protected during CBM development, a key objective was to improve available scientific information on Alberta's water resources. Another objective was to ensure aquifers and water

supplies were protected through the application of appropriate policy and regulations. Confirming appropriate sources of drilling fluids was an important objective, as was promoting the wise use and conservation of water. Finally, the MAC identified the need to investigate the potential for CBM migration and release.

1.2 Deliverables

The MAC Final Report included 13 recommendations specifically on water. Of these, four are complete, three are on schedule and six are behind schedule. A list of reports and other deliverables related to protecting water resources is provided below:

- **Simplified Regulatory Process for CBM Non-saline Water Production:** While this deliverable remains behind schedule, ERCB and AENV continue to work collaboratively to finalize a one-window simplified process (code of practice or similar approach) for lower risk groundwater diversions below the interim threshold volume that was established in 2006 by a sub-committee of the MAC. A draft process is expected to be available for consultation later in 2009.

- **Guidelines for Groundwater Diversion for Coalbed Methane/Natural Gas in Coal Development:** Introduced in 2004 by AENV, the guidelines specify the requirements to obtain authorization to divert non-saline water for CBM production. Further information can be found on AENV's website at www.gov.ab.ca/env/water/Legislation/Guidelines/groundwaterdiversionguidelines-methgasnatgasincoal.pdf. The guidelines will be updated to compliment the simplified regulatory process for smaller, lower risk non-saline water diversion; a draft will be released later in 2009 for consultation.

- **Water Well Complaint Process:** Government continues to improve its response to all water well complaints. The 1-800-222-6514 Environment Hotline number was communicated to the public at CBM information sessions held in spring 2006. Water well training workshops were held for AENV and ERCB staff to increase their knowledge of water well issues and improve the complaint process. An independent review by the Alberta Research Council in 2008 of four water well complaints handled by AENV showed the wells in question were likely not adversely affected by CBM activity. Further information on the report can be found on the Water for Life website at http://www.waterforlife.alberta.ca/.

- **Beneficial Use of Produced Water:** Two scoping studies on the beneficial use of produced water were undertaken to look at the potential for treatment and use of non-saline and marginally saline produced water. The studies noted that, to date, there has been very little produced water from CBM activities. The reports are available on the Petroleum Technology Alliance Canada (PTAC)'s website at www.ptac.org/etalk/dl/HighTDS.pdf and www.ptac.org/etalk/dl/LowTDS.pdf. The negligible volume of non-saline water produced to date has precluded the development of a comprehensive beneficial use policy; however, general beneficial use considerations will be included in the revised Groundwater Diversion Guidelines to be released later in 2009 for consultation.

- **Water Innovation Forums:** Since 2005, PTAC has held annual one-day industry events where industry can sponsor speakers who have been working on innovative water conservation and use technology. Further information on the forums can be found on the PTAC website at www.ptac.org/env/envfw.html.

- **Water well monitoring:** AENV has added 25 wells to the provincial Groundwater Observation Well Network (GOWN) since 2007, bringing the total number of sites up to 216. Sixteen of the added wells are in CBM areas. AENV initiated a water and gas sampling program in 2006 and has sampled 116 GOWN and other wells to March 2009, with the majority of these being in CBM areas. Sampling of 30 to 40 wells per year will continue on an ongoing basis. Information from water well monitoring and sampling will help industry and government better understand and protect Alberta's groundwater resources.

- **Edmonton-Calgary Corridor study:** AENV and the Alberta Geological Survey have partnered for a long-term provincial groundwater inventory and mapping program. This started with work in the Edmonton-Calgary corridor, which has experienced the most CBM activity to date.

- **Gas Migration Study:** This study investigated the potential for gas migration as a result of CBM development and is available on the AENV website at http://environment.gov.ab.ca/info/posting.asp?assetid=8172&searchtype=as. The AENV/ERCB joint response to the report is available on the AENV website at http://environment.gov.ab.ca/info/posting.asp?assetid=8176&searchtype=as.

- **ERCB Bulletin 2007-10:** This bulletin announced the new Base of Groundwater Protection (BGWP) database and is available on the ERCB website. The Bulletin provides an overview of the BGWP information and reiterates cementing requirements designed to protect groundwater.

- **ERCB Directive 27:** An interim directive was released in 2006 to impose shallow fracturing controls to help protect water resources. A Multi-stakeholder Shallow Fracturing Steering Committee was formed which recommended a study be commissioned to look at available fracturing data to assist in the development of science-based shallow fracturing requirements. The directive was updated and released in August, 2009 and can be found on the ERCB website.

- **ERCB Directive 35:** The AENV Standard for Baseline Water Well Testing (BWWT) for Coalbed Methane/Natural Gas in Coal Operations was implemented by the ERCB in May, 2006. It specified the water well testing requirements operators must undertake prior to drilling or recompleting a CBM well. The Standard is available on the AENV website at http://environment.alberta.ca/3203.html, while Directive 35 is available on the ERCB website. A Science Panel was established to review the effectiveness of the BWWT program. Its final report is available on the AENV website at http://environment.alberta.ca/3430.html.

- **ERCB Directive 36:** This directive was updated in 2006 to address non-toxic components as part of the overall minimum equipment and procedure requirements that the licensee must follow when drilling wells in Alberta.

- **ERCB Directive 43:** This directive requires industry to undertake shallow logging to provide additional information to assist groundwater mapping and water well complaint investigations.

- **ERCB Directive 44:** This directive, "Requirements for the Surveillance, Sampling, and Analysis of Water Production in Oil and Gas Wells Completed Above the Base of Groundwater Protection (BGWP)" has resulted in increased surveillance of water production at all oil and gas wells with perforations above the BGWP. The directive enhances produced water sampling and provides more accurate information to AENV.

- **Protection of Alberta Groundwater Resources:** AENV and ERCB signed a Memorandum of Understanding in December 2007 to ensure a coordinated and collaborative approach within government to protect groundwater resources in Alberta.

- **Ardley project:** The AGS project reviews the interface between the Paskapoo and Ardley formation and will contribute to a better understanding of the risks that may be associated with CBM development in the Ardley coals. A report is currently under review and will be available later in 2009.

1.3 Ongoing Commitment

Water for Life: The original Water for Life strategy was unveiled in November 2003, at the same time the MAC started its review of CBM development in Alberta. The renewed strategy, released in 2008, confirmed and updated the original strategy. The three key goals of the renewed strategy are to ensure: a safe, secure drinking water supply; a healthy aquatic ecosystem and; reliable, quality water supplies for a sustainable economy. To support the strategy, the Alberta Water Research Institute was established in 2007 to help coordinate world class and leading edge water research.

Land-use Framework (LUF): The LUF proposes seven key strategies to improve land-use decision-making in the province. Two strategies in particular exemplify a continued commitment to MAC - Outcome 1: Protecting Water Resources:

- Strategy 1 proposes the development of seven regional land-use plans to formalize coordination of land use decisions for the Alberta government and municipalities to provide an integrated process for land, air, and water management. The regional plans will: integrate provincial policies at the regional level; set out regional land-use objectives; and provide the context for land-use decision-making within the region. The regional plans will also reflect the uniqueness and priorities of each region. Municipalities, other local authorities and provincial government departments will be required to comply with each regional plan.

- Strategy 3 addresses how "Cumulative effects management will be used at the regional level to manage the impacts of development on land, water and air." Alberta's system for assessing the environmental impacts of new developments has usually been done on a project-by-project basis. While this worked at lower levels of development activity, it did not address the combined or cumulative effects of multiple developments which have taken place over time. A cumulative effects management approach will be used in regional plans to manage the combined impacts of existing and new activities within the region. Using this approach within a regional planning framework for CBM or other unconventional gas plays will identify opportunities for industry and communities to work together to better manage competing land priorities e.g., oil and gas development, forestry and mining, agriculture, recreation, and local housing and infrastructure.

2. Enhancing Information and Knowledge

When the MAC was established in 2003, much of the available information regarding CBM development came from jurisdictions where both the geology and regulatory framework differed significantly from that in Alberta. The initial lack of Alberta-based information resulted in concerns by some stakeholders about the potential impact of future CBM development. The expanded collection of Alberta-based CBM information and knowledge, and communication of the facts to Albertans, has been key to the success of the MAC process.

2.1 Objectives

The objective of this key issue was to ensure current, accurate information and data is available on CBM development in Alberta and related issues. In particular, there was an identified need to improve available scientific information on the province's water and CBM resources.

2.2 Deliverables

The MAC Final Report contained six recommendations relating to enhancing information and knowledge. Work has been completed on three recommendations (one of which will be addressed through other broader government initiatives), one is on schedule, two recommendations were not accepted and no recommendations are behind schedule. The main reports and other deliverables include:

- **One Year Mineral Lease Continuations:** A review of the history of Alberta CBM production and an investigation of methods used by industry for mineral lease continuations determined that the current regulation allowing for a one year continuation is sufficient.

The following initiatives also relate to enhancing information and knowledge, and have already been discussed in Section 1.2:

- Water Well Monitoring
- Edmonton-Calgary Corridor Study
- Ardley Project
- Water Innovation Forum

- Water Well Complaint Process
- Protection of Alberta Groundwater Resources
- ERCB Directive 27
- ERCB Directive 35
- ERCB Directive 43
- ERCB Bulletin 2007-10

2.3 Ongoing Commitment

The government is committed to ensuring that current and accurate information continues to be available to Albertans regarding CBM and related issues. Government departments will continue to work together to identify opportunities for better efficiencies on how the information is shared with the public.

Provincial Energy Strategy: The PES identifies the need to "bolster knowledge and awareness of and appropriate education on energy issues." The strategy to complete this objective is under development. The government will prepare an annual report card to communicate progress to Albertans. The report card will also showcase collaboration across government on energy-related matters and it will be incorporated into annual business plan reporting.

Land-use Framework: Strategy 6 under the LUF is to "Establish an information, monitoring and knowledge system to contribute to continuous improvement of land-use planning and decision making." Good land-use decisions require accurate, timely and accessible information. A sound monitoring, evaluation and reporting system is needed to ensure the outcomes of the LUF are achieved. The government will collect the required information to support land-use planning and decision-making. This information will be used to create an integrated information system to ensure decision-makers have access to relevant information. The system will include regular monitoring, evaluation and reporting on the overall state of the land, and progress toward achieving provincial and regional land-use outcomes.

Strategy 7 under the LUF specifically addresses the requirement to undertake inclusion of Aboriginal peoples in land-use planning.

3. Minimizing Surface Impacts

The MAC's recommendations on minimizing surface impacts range from activities associated with local improvements to looking at potential major changes resulting from reviews of province-wide land use policy.

3.1 Objectives

Objectives included reviewing the regulatory process to identify ways to minimize surface disturbance, reducing cumulative impacts associated with CBM development, addressing noise related issues and protecting wildlife. The MAC identified steps that should be undertaken through the ILM process to assist with minimizing surface impacts. Government and researchers were to identify opportunities to improve the science and technology for remediation and

reclamation of land, particularly in sensitive areas that could be impacted by CBM. Another objective was to review the current application process to promote project-based planning and disclosure, in particular for high density CBM developments.

3.2 Deliverables

All six recommendations relating to this key issue have been addressed (two of which will be addressed through other broader government initiatives). The main reports and other deliverables include:

- **Integrated Land Management Program:** As mentioned earlier in the document, the ILM program's approach encourages users of public land to work together to reduce their impact on the land.

- **Best Management Practices:** Associated with the ILM program, the development of "best management practices" has been undertaken for CBM, both in central and in north central Alberta. These practices identify options to reduce the environmental footprint created by energy development. Techniques such as multi-well pads and modified locations for wells have been tested.

- **Enhanced Area Operating Agreements:** Alternative consultation and stakeholder involvement options under an enhanced Area Operating Agreement are being attempted in order to be more pro-active in minimizing surface impacts.

- **Restoration of Rough Fescue (Festuca campestris) Grassland on Pipelines in Southwestern Alberta:** SRD sponsored a study on Foothills fescue reclamation and is reviewing the study recommendations. Well-managed fescue grasslands provide a low maintenance and high production source of feed, especially in winter and are a valuable resource for livestock production. The outcomes of the study include the creation of the Fescue Forum (industry and government group) to conduct and review research on reclamation and the development of new reclamation standards for the native prairie grasslands. The report is on the SRD website at http://www.srd.gov.ab.ca/lands/managingpublicland/rangemanagement/monitoringreferenceareas.aspx.

- **Land Pilot Initiative:** Two pilot projects were undertaken by the ERCB in central Alberta to examine ways to promote improved CBM project planning and disclosure. These pilot projects included earlier engagement of stakeholders in the planning process, better information exchange and more coordination between government, industry and stakeholders. Outcomes of the two pilot projects can be found on the ERCB website at http://www.ercb.ca.

- **Canadian Association of Petroleum Producers (CAPP) Best Management Practices for Natural Gas in Coal (NGC)/Coalbed Methane (CBM):** The best management practices (BMP) document includes information on many issues associated with CBM development, including how to quickly deal with short-term noise complaints not currently covered under

ERCB's Directive 38. The BMPs will be reviewed every few years to ensure practices are current and reflect any new issues. The document can be found on CAPP's website at http://www.capp.ca/Pages/DocInfo.aspx?DocID=103407.

- **ERCB Directive 65**: Changes were made to the directive and regulations regarding the management of commingled production in the wellbore. The changes assisted in reducing the number of future wellbores required to recover oil and gas resources, thereby minimizing the impact to the surface.

3.3 Ongoing Commitment

Even though all recommendations in this section on minimizing surface impacts have been addressed, the government remains committed to the continued responsible development of resources such as CBM. The following initiatives will address not only CBM issues but to a range of related activities as well.

Provincial Energy Strategy: The PES addresses the need to "properly account for cumulative effects to the environment". Energy production and consumption decisions will also have to consider cumulative impacts to the environment, including impacts to the land, air and water.

Land-use Framework: Strategy 5 of the LUF is to "Promote efficient use of land to reduce the footprint of human activities on Alberta's landscape." This underlying principle should guide all areas of land-use decision-making. The future regional plans under LUF will identify mechanisms to mitigate the surface impacts of CBM and other industrial development.

Integrated Land Management: The ILM program focuses on managing and reducing the industrial, recreational and other footprints, reclaiming the land, and providing an appropriate level of access. The program will address the challenge of managing the needs of industry with the needs of other users to sustain the productivity of the land, and provide options for land and resource use in the future. The program and associated planning approaches will assist industry and stakeholders by providing a "tool" for mitigation. The various components in the program will be available to industry to assist them in better planning and delivering the objectives of minimizing surface impacts.

Area Operating Agreements (AOAs): AOAs are currently being used and will be the primary technique utilized by industry in the future to design their development plans. This will involve taking a "landscape" approach to better assess the surface impacts and potentially link surface with subsurface activity. This linkage will assist both industry and regulators in understanding the full spectrum of the present and the future "footprint". Through the use of this tool, the objectives of both the LUF regional plans and the ILM program will be realized.

Land Use Operating (Wildlife) Guidelines: Work is underway to develop a regional or area specific guideline that can be used by industry when designing their applications and their development impacts. These will assist in providing priorities and approaches that can be used to reduce the impacts on all wildlife species, especially the ones listed as threatened or endangered under the *Species At Risk Act.*

4. Communication and Consultation

The focus of communication and consultation is to increase opportunities for dialogue and public awareness on possible impacts of CBM development so that Albertans are better informed and engaged.

4.1 Objectives

Objectives included ensuring industry is aware of requirements to protect non-saline aquifers and to increase opportunities for stakeholder input on CBM development and its potential impacts. The MAC also identified a need to ensure better access to data and information relating to CBM, including both paper to electronic options. The need to help address issues related to split-title ownership was also identified[1].

4.2 Deliverables

Government, stakeholders and industry have all taken steps to improve the availability of Alberta-based information pertaining to CBM. For example, information on CBM is available on several government websites. The ERCB provides monthly CBM well location reports and has also created or updated a number of directives to address specific aspects of CBM development.

The availability of CBM information has not been limited to government. For example, each fall the Canadian Society for Unconventional Gas hosts the largest unconventional gas conference in North America, where stakeholders have an opportunity to exchange information on unconventional gas issues.

Of the 18 recommendations in this category, 15 are complete (one of which will be addressed through other broader government initiatives), two are on schedule and one was reviewed with no action taken. The main reports and other deliverables include:

- **Clarification of Split-Title Ownership Risks:** Information regarding the potential risks and associated impacts of split-title ownership issues was posted to the DOE website at http://www.energy.alberta.ca/NaturalGas/CBM_Pdfs/Split_Title_Mineral_Ownership.pdf.

- **Freehold Oil and Gas Issues Stakeholder Consultation:** In 2009, a multi-stakeholder consultation process, led by former Alberta Energy Parliamentary Assistant, Len Webber, was established to facilitate parties in addressing split-title ownership. An independent

[1] Provincial legislation (the *Mines and Minerals Act* and associated Regulations) is conclusive in determining the ownership of CBM where the Crown owns both coal and natural gas. However, in the instances of where coal rights are freehold owned and natural gas rights are Crown-owned, vice versa, or two separate freehold owners exist, the matter is to be determined and ruled on by the courts. For Crown-owned mineral rights, CBM is considered to be natural gas and is administered in the same manner as conventional gas. If lands and/or rights in an agreement are no longer considered productive, Alberta Energy will serve a one-year notice (Section 18 in the Petroleum and Natural Gas Tenure Regulation) which requires the lessee to prove the rights productive or the rights will revert to the Crown.

consultant met with stakeholders individually in February/March, and held a group session in March to develop consensus-based recommendations for consideration by the Minister of Energy. The consultant's recommendations on the split-title issue are currently under review by the DOE.

- **Section 18 Notices Review:** A new technical review was undertaken, which determined that serving more Section 18 notices under the Petroleum and Natural Gas Tenure Regulation would not result in an increase in the release of shallow rights to industry. As such, there was no identified need to change the existing regulation.

- **CBM Best Management Practices:** Best management practices were developed by CAPP to assist industry in better understanding how to reduce the environmental impacts of CBM development. Further information can be found on the CAPP website at http://www.capp.ca/Pages/DocInfo.aspx?DocID=103407.

- **Creation of unique fluid codes for CBM:** The ERCB created unique fluid codes for CBM in order to more effectively track production and development.

- **Clarification of 'wells per section per pool':** In order to avoid misunderstanding of the number of wells approved per section, the ERCB included a well density clause in its spacing/holding applications.

- **Groundwater and CBM Public Information Sessions:** A series of 13 information sessions were held across Alberta in 2006 to provide better information on CBM and potential impacts to groundwater. Further information can be found at the AENV website at http://www.environment.alberta.ca/documents/Working_Well_program_update_aug08-08.pdf.

- **Working Well Program:** An outcome from the above-noted information sessions was the delivery of additional workshops to focus on water well management (i.e. proper construction, operation and maintenance). The Working Well program was launched in 2008 and, to date, over 40 workshops have been delivered to water well owners in rural communities across Alberta. Further information can be found on the AENV website at http://www.environment.alberta.ca/3081.html.

- **Creation of the MAC II:** The MAC II was established to review progress in addressing the MAC Final Report recommendations and provide public updates for a three year period. Further information can be found on the DOE website at http://www.energy.alberta.ca/NaturalGas/561.asp.

- **Online Mapping Tool for P&NG Sales and Oil Sands Sales Data:** An on-line mapping tool was developed to display the most recent results of P&NG sales, oil sands sales data and existing agreements. Further information can be found on the DOE website at http://www.energy.alberta.ca/OurBusiness/1072.asp#Sales

- **Website Instructions on the Process for Conducting an Information Search:** DOE's website was modified to make it easier for the public to conduct an information search by land or mineral agreement. Interactive maps are on the DOE website at http://www.energy.alberta.ca/OurBusiness/1069.asp.

- **Improve Education/Certification of Land Agents:** The Land Agents Licensing Regulation was amended to include post-secondary education requirements and more stringent standards of conduct. This will help to ensure that land agents are knowledgeable and understand about the potential impacts of CBM and other gas developments.

- **ERCB Directive 27:** See Section 1.2.

- **ERCB Directive 35:** See Section 1.2. The requirements of this directive include expanded notification and water well testing opportunities for landowners with water wells in the vicinity of shallow CBM wells.

- **ERCB ST 109:** CBM well locations were initially reported on an annual basis. In order to improve access to this information a monthly report on CBM well locations is now available through the ERCB.

4.3 Ongoing Commitment

Provincial Energy Strategy: An approach under the PES's outcome of "Sustained Economic Prosperity" is to "create a better understanding among stakeholders, including energy customers within and beyond our boundaries, of our efforts to manage the environmental footprint of energy development." The PES identified the need for effective communication and consultation and will provide its findings in an annual report to Albertans. The PES specifically references the need to "consult Aboriginal communities whose constitutionally protected rights under section 35 of the *Constitution Act*, 1982 (Canada) are potentially adversely impacted by development".

The MAC consultation process demonstrated how timely, accurate, Alberta-based information can facilitate understanding and help develop an environment which encourages co-operation.

Land-use Framework: LUF Strategy 6 outlines the need to establish an information, monitoring and knowledge system. Creating an "improved Integrated Information Management System that monitors the state of the land and the status of land use in the province" provides clear benefits to achieving this outcome. Stakeholder consultation, part of the LUF regional planning process, also contributes to this MAC outcome by ensuring that "Stakeholders are fairly engaged in planning processes, which in turn improves the quality of land-use decisions and builds confidence in the decision-making processes".

5. Other

The MAC Final Report identified the need for sufficient financial and human resources to successfully address the recommendations (recommendation 7.7.1). Although this

recommendation has been addressed, it will be an ongoing focus for the government, which will continue to work towards ensuring effective and efficient allocation of resources. The government will continue to identify opportunities to work collaboratively both cross-ministry and with external stakeholders.

ADDENDUM
Additional Completed Final Report Recommendation

Recommendation 3.4.2
Since this report was reviewed by the MAC II, recommendation #3.4.2 (to investigate whether CBM drilling and completion practices such as using dugout water and untreated river water may affect aquifers) has been completed with the release of ERCB report 2009-C: "Risk to Water Wells of Pathogens in Drilling Fluids". The report can be found on the ERCB website at http://www.ercb.ca. The total number of completed recommendations is now thirty; six are on schedule, five are behind schedule and one was reviewed and not actioned.

Non-government MAC II Members' Feedback

The following section reflects feedback from non-government MAC II members on the progress achieved in addressing the MAC Final Report recommendations. This feedback was gathered through the distribution of a questionnaire. The input from non-government members who provided a response is summarized below.

Government Commitment

All questionnaire respondents agreed that the provincial government has shown ongoing commitment in addressing the MAC Final Report recommendations. One respondent was pleased that a number of the recommendations would continue to be addressed under ongoing broader government initiatives.

Progress

One respondent strongly agreed, one neither agreed nor disagreed and the rest agreed that there has been significant progress on most of the 42 accepted recommendations since the release of the MAC Final Report in 2006.

Early Action

Half of respondents agreed and half strongly agreed that recommendations identified for early action have been appropriately addressed since the release of the MAC Final Report.

CBM Processes

With one exception, respondents agreed or strongly agreed that the deliverables which were developed in response to the MAC Final Report recommendations helped improve existing processes relating to CBM development in Alberta. One non-industry respondent disagreed strongly with this statement. Another non-industry respondent wanted a stronger focus on enforcement.

MAC II Process

Almost all respondents agreed or strongly agreed that the MAC II process helped ensure MAC Final Report recommendations were implemented. One respondent who had not been involved for all of the three year MAC II process neither agreed nor disagreed.

Another respondent thought the process worked well and that all MAC II members had ample opportunity to state their case and reach agreement in most cases. The process afforded a good opportunity for open dialogue, said another respondent: "There was good agreement by all members of the committee on the various issues at the last meeting."

Another respondent expressed frustration with the 'out of scope' categorization of issues relating to freehold mineral rights but was pleased with the process for addressing MAC recommendation 6.2.2, which called for the government to set up a process to facilitate parties coming together to work toward resolution of split-title ownership issues.

Members generally believed that the MAC II process itself was well organized, Red Deer was a good location for meetings, and the meetings themselves were well-run and reasonably efficient. One respondent noted that communication was at times a concern but expressed overall satisfaction with the process.

Expectations

With one exception, all respondents agreed or strongly agreed that they found it worthwhile to be part of the MAC II process and that their expectations for the MAC II process were met. One respondent neither agreed nor disagreed.

Comments

Respondents were also asked to comment on the following areas:

- Protecting water resources
- Enhancing information and knowledge
- Minimizing surface impacts
- Communication and consultation

The feedback on these areas is separated into two groups:

1. Feedback from non-industry members, such as landowner and environmental groups and
2. Feedback from the industry, which includes energy industry association members.

Protecting Water Resources

The MAC Final Report identified protection of water resources as a significant concern related to CBM development. Water-related recommendations included establishing a more rigorous regulatory process to address CBM operations that potentially pose a risk to non-saline water resources. The development of standard procedures and reporting requirements for sampling, analysis and monitoring of both saline and non-saline water quality and quantity for CBM wells and potentially affected water wells is also important. Protection of water resources was a major concern and a priority for all respondents.

Non-Industry Feedback

One respondent indicated that this area is the one most in need of ongoing diligence. The forthcoming results of aquifer mapping research will be critical to protecting the province's water resources. This research may require Albertans to revisit existing policies, according to this respondent.

Another respondent believed that more needs to be done to protect aquifers and landowners' water wells from potential gas seepage.

Industry Feedback
A large amount of effort has gone into those recommendations that provide protection of Alberta's groundwater resources, noted one industry respondent. However, disappointment was expressed regarding the Science Panel's review of water well test results. This information would have helped provide assurance that CBM development was not impacting groundwater resources.

Another industry respondent noted that much has been accomplished to protect groundwater from industrial use, however, felt little has been done to protect groundwater from other major users. This respondent also expressed disappointment that the Science Panel did not undertake water well analysis and that setback regulations were not based on scientific analysis of data.

Enhancing Information and Knowledge

The MAC Final Report indicated that more information and knowledge are required in order to ensure the continued responsible development of CBM in the province. For example, there was an 'umbrella' recommendation to improve scientific information about the province's water resources, including completion of a groundwater inventory and the Base of Groundwater Protection (BGWP) mapping project, and obtaining baseline data on water quality and quantity in non-saline aquifers. As well, more scientific information was needed to develop a threshold volume of produced water below which a simplified code of practice or similar regulatory practice would apply.

Non-Industry Feedback
One respondent expressed the view that he felt a large amount of information had come to light regarding regulations that both industry and landowners were unaware of, e.g., regulations regarding fracturing. The respondent also commented that use of the government website for making information available is not suitable for some Albertans, and other methods of publishing information should be added.

Another respondent noted the collective experience and resources shared at the MAC II table have thrown much light on the recommendations and policy being tracked. The process was clearly effective in some respects, said another respondent, who also suggested the names of committee members be publicly available to assist with better tracking of outcomes.

Relative to recommendation 3.3.1, one respondent suggested having a lower threshold volume for produced non-saline water below which a simplified approval process would apply. Another respondent supported the new requirements but noted that enforcement is needed to ensure that they are met.

Industry Feedback
Industry stakeholders indicated that the information shared at the MAC II meetings was very instructive and thought provoking. This information encouraged ongoing discussion, noted one

respondent. Another respondent indicated that the MAC II provided an opportunity for ongoing dialog / information exchange between the government and stakeholders.

Minimizing Surface Impacts

Recommendations in the MAC Final Report which focused on surface impacts addressed the need to protect the environment and minimize cumulative impacts. For example, the MAC recommended that the CBM regulatory process promote project-based planning to manage potential long-term surface impacts.

Non-Industry Feedback
In part due to the long-term CBM consultation initiative, citizen expectations for reduced footprint management practices are now quite high, noted one respondent. The same respondent suggested industry appears prepared and able to deliver such a standard in the field without requiring regulation by government, and that landowners are hopeful this will happen.

Another respondent indicated that the timing of vehicle movement and the protection of top soil were important aspects of preventing surface impacts from CBM activity.

In theory, commingling of production minimizes surface impact, said one respondent but felt that until the split title situation is adequately addressed through government legislation, the threat of lawsuits remains for both industry and freehold owners. The respondent also commented that while government made great effort to understand and address surface issues, freehold issues impacting freehold development were not well addressed.

Industry Feedback
Some good work was done to try to determine how to minimize surface impacts, particularly the SRD-led Mannville CBM pilot, said one respondent. However, a number of the techniques used in this pilot (i.e., pad drilling, horizontal wells, etc.) were not applicable to the dry, shallow coals in the Horseshoe Canyon formation where most CBM activity is taking place.

Communication and Consultation

The MAC Final Report indicated the need for enhanced communication and ongoing consultation on CBM-related topics with all stakeholders, including members of the public.

Non-Industry Feedback
As with MAC, the MAC II process has continued to provide a respectful and constructive forum for all stakeholders to interact, noted one respondent. Collective experience and resources shared at the table have thrown much light on the recommendations and policy being tracked.

There was again concern expressed about communication issues related to freehold mineral rights.

Industry Feedback
There was overall satisfaction expressed about opportunities for ongoing dialogue and information exchange.

Summary of Feedback

Respondents in general were very satisfied with the MAC II process, and believed it helped ensure the accountability of government in carrying out the MAC's recommendations. They strongly believed the government had demonstrated its commitment in implementing the recommendations. Their expectations were met, they said, especially around the implementation of the recommendations slated for early action. The respondents also appreciated that the MAC II process provided an excellent opportunity for dialogue and information exchange. They found it very worthwhile to be part of the MAC II process.

Commitment to Ongoing Responsible CBM Development

For over 60 years, Alberta's regulatory frameworks have ensured that energy development takes place in a manner that is fair, responsible and in the public interest.

Although this is the third and final public update report on the status of MAC Final Report recommendations, the government will continue its commitment for responsible development, not just for CBM, but for all of the province's oil and gas resources.

AENV, SRD and DOE (which are primarily responsible for energy policy development) and the ERCB (which is primarily responsible for regulating CBM and other oil and gas development), will continue to work together in other collaborative processes to address outstanding CBM-related issues.

Acronyms and Glossary of Terms

Acronyms:

AENV	Alberta Environment
AERI	Alberta Energy Research Institute
AGS	Alberta Geological Survey
AOA	Area Operating Agreements
BGWP	Base of Groundwater Protection
BMP	Best Management Practices
BWWT	Baseline Water Well Testing
CAPL	Canadian Association of Petroleum Landmen
CAPP	Canadian Association of Petroleum Producers
CSUG	Canadian Society for Unconventional Gas
CBM	Coalbed Methane
CoP	Code of Practice
DOE	Alberta Department of Energy
ECC	Edmonton-Calgary Corridor
ERCB	Energy Resources Conservation Board (formerly the EUB: the Alberta Energy and Utilities Board)
GoA	Government of Alberta
GOWN	Groundwater Observation Well Network
ILM	Integrated Land Management
LUF	Land-use Framework
MAC/MAC II	Coalbed Methane Multi-Stakeholder Advisory Committee
MOU	Memorandum of Understanding
PES	Provincial Energy Strategy
PTAC	Petroleum Technology Alliance Canada
P&NG	Petroleum and Natural Gas
RAC	Regional Advisory Council
SRD	Alberta Sustainable Resource Development
TDS	Total dissolved solids
U of C	University of Calgary
UOGPIP	Upstream Oil and Gas Policy Integration Project

Glossary of Terms:

Abandonment: The permanent dismantlement of an oil or gas well or facility in the manner prescribed by the regulations including any measures required to ensure that the facility is left in a permanently safe and secure condition.

Aquifer: As defined by the Alberta Government's *Water Act*, an underground water-bearing formation that is capable of yielding water.

Best management practices: Management practices or techniques recognized to be the most effective and practical means to develop the resource, while minimizing adverse environmental and other effects.

Casing: A series of tubular pipes joined by threads and couplings that line a well bore to prevent water and rock from entering into the well bore. In oil and gas wells is also used for drilling control and wellbore integrity.

Coal: A black or brownish-black solid combustible substance formed by the partial decomposition of organic matter without access to air.

Coal seam: Descriptive term for individual layers of coal found in the geological strata. It is also called a 'bed' in the coal industry.

Coal zone: A vertical extent of intermittent coal seams and intermingled shale or clay. The zone extends from the top of the uppermost seam to the bottom of the lowermost seam.

Coalbed methane (CBM): Methane found in coal deposits.

Commingling (oil & gas): Mixing oil and or gas from two or more different pools in the same well bore.

Commingling (water): Mixing water from two or more different aquifers in the same well bore.

Conventional natural gas: Conventional natural gas includes many different types and compositions of natural gas, and is generally better defined, more productive and more economic than natural gas produced from unconventional sources. Any type of unconventional gas resource can move into the conventional category over time, as the resource is developed.

Crown: Depending on jurisdiction, the Crown is either represented by the federal or Alberta government.

Drilling fluid: The circulating fluid (mud) used to bring drilling cuttings out of the well bore, cool the drill bit, and provide hole stability and pressure control. Drilling mud includes a number of additives to maintain the fluid at desired viscosities and weights. Drilling fluids are also needed to complete water wells.

Formation: A designated subsurface layer that is composed of substantially the same kind of rock or rock types.

Fracturing: A method of improving the permeability of a reservoir by pumping fluids such as water or carbon dioxide, and nitrogen into the reservoir at sufficient pressure to crack or fracture the rock. It is also known as 'fracing'.

Freehold mineral rights: The Alberta Crown owns mineral rights which cover approximately 81 percent of the land area of Alberta. The remaining 19 per cent are freehold minerals rights

owned by private individuals and companies or minerals owned by the federal government (National Parks, Indian Reserves).

Gas migration: The movement of hydrocarbons from their source into reservoir rocks.

Groundwater: Water that occurs under the surface of the ground.

Landowner: See 'Surface rights holder'

Lessee: Defined in the *Mines and Minerals Act* as the holder according to the records of the Department of Energy of an agreement. The term 'lessees' may, therefore, refer to holders of leases or licences or both, depending on the context in which it is used.

Methane: The most prevalent component of much of the natural gas produced in Alberta. Its chemical notation is CH_4 and it is the most common hydrocarbon gas.

Mineral rights: Entitlement, through ownership or a leasing arrangement, to produce and sell the minerals in a parcel of land.

Migration: Movement from one place to another.

Natural Gas: A mixture of hydrocarbon gases which occurs with petroleum deposits, principally methane together with varying quantities of ethane, propane, butane, and other gases, and is used as a fuel and in the manufacture of organic compounds

Non-saline water: Water with total dissolved solids content less than 4000 milligrams per litre (mg/L). See also 'Saline groundwater'.

Operator: The company or individual responsible for managing an exploration, development, or production operation.

Pool: A natural underground reservoir containing an accumulation of oil or gas or both, separated or appearing to be separated from any other such accumulation.

Produced water: The water extracted from the subsurface along with produced oil and gas, including water from the reservoir, water that has been injected into the formation, and any chemicals added during the production/treatment process.

Reclamation: Process of restoring surface environment to acceptable pre-existing conditions.

Remediation: Cleanup of an environmentally contaminated site.

Saline groundwater: Water that has total dissolved solids content exceeding 4000 mg/L as defined in the Water (Ministerial) Regulation.

Section: An area one mile square or as close as the convergence of the meridians permit.

Sensitive areas: Lands or associated features requiring protection, including critical wildlife habitat, rare and endangered plant species, native prairies, areas prone to erosion or other geotechnical failure, or cultural heritage sites.

Split title: Where subsurface rights are owned by different parties, e.g., the Crown owns the coal rights and the P&NG rights are freehold, or vice versa, or two separate freehold owners exist.

Subsurface: Below the surface.

Subsurface rights holder: The owner or lessee of the mineral rights who has the right to explore for and produce oil, gas, and other minerals. The owner may be a freehold rights owner or the Crown.

Surface rights holder: The owner or lessee of the surface rights (the landowner) has control of the land's surface and the right to work it, in addition to any sand, gravel, peat, clay or marl which can be excavated by surface operations.

Total Dissolved Solids (TDS): A measure of concentration or how much substance is dissolved in a given sample.

Tenure: Term used to describe the system whereby mineral rights are managed by the Department of Energy and disposed to individuals and companies as agreements.

Township: A term used in the 'Alberta Township System'. Depending on the context in which it is used, it refers either to a six square mile area comprising 36 sections or to a row of townships spanning from north to south across Alberta. Township 1 lies at the southernmost boundary of Alberta and Township 126 lies at the northernmost boundary.

Unconventional Natural Gas: Typically, unconventional natural gas is gas that is more difficult, and less economically sound, to extract, usually because the technology to reach it has not been developed fully, or is too expensive. Examples include coalbed methane and gas from shale.

Water Act: The Alberta *Water Act* protects the quality of water and manages its distribution. The legislation regulates all development and activities that might affect rivers, lakes, and groundwater.

Water quality: Refers to a set of chemical, physical, or biological characteristics that describe the condition of a river, stream, lake, or aquifer.

Water well: As defined in the *Water Act*, an opening in the ground, whether drilled or altered from its natural state, which is used for:

1. the production of groundwater for any purpose,
2. obtaining data on groundwater, or
3. recharging an underground formation from which groundwater can be recovered and includes any related equipment; buildings, structures and appurtenances.

Well density: The concentration of wells on the land surface (per unit area).

Zone: Defined in the Petroleum and Natural Gas Regulation as a stratum or series of strata considered by the Minister to be a zone for the purposes of this Regulation. In many cases, zones may be geological formations or members but in some instances they are larger (geological groups) and include more than one formation (the Mannville zone, for instance, includes numerous formations).

Appendix A MAC II Membership

Non-Industry Members:

- Alberta Association of Municipal Districts & Counties
- Alberta Environmentally Sustainable Agriculture Council
- Alberta Surface Rights Federation
- Butte Action Committee
- Freehold Owners Association of Alberta
- The Pembina Institute
- Alberta Beef Producers

Industry Members:

- The Coal Association of Alberta
- Canadian Association of Petroleum Producers (CAPP)/Canadian Society for Unconventional Gas (CSUG)/Small Explorers and Producers Association of Canada (SEPAC) – represented by two members on the MAC II
- Canadian Association of Petroleum Landmen

Provincial Government Members:

- Alberta Agriculture and Rural Development
- Alberta Energy
- Alberta Energy Resources Conservation Board
- Alberta Environment
- Alberta Sustainable Resource Development

Facilitator:

- Alberta Culture and Community Spirit

29 - complete
6 - on schedule
6 - behind schedule
1 - reviewed and not actioned
2 - not accepted
44 Total Recommendations

Appendix B: Progress Table
MAC Recommendations
As of August 15, 2009

Note: Early Action Items Indicated in Bold Face Type

Rec #	Recommendation Description*	Targeted Year of Completion	Status	Action Taken	Comments
Protecting Water Resources					
3.3.1	AENV should establish a multi-stakeholder technical committee to determine an appropriate, scientifically-based threshold volume for produced non-saline water below which a simplified approval under a Code of Practice for production or use of the water would apply.	2008	behind schedule	ARC report on developing a scientifically based threshold volume completed in March '06. Interim threshold volumes developed by a sub-committee of MAC have been adopted. Stakeholder workshop held Dec. 14/'06 to discuss Code of Practice (CoP) concepts. Process to review threshold limits also discussed at the workshop. Background information being collected (mapping, monitoring, surveillance) to provide the necessary information for development of scientifically based threshold volumes. AENV and ERCB are working together to examine and develop options for a streamlined, one-window simplified regulatory process to address the joint needs. The simplified regulatory process is currently being drafted. Existing guidelines for production above the threshold also being revised. The simplified regulatory process will	

E denotes early action as defined CBM Final Report
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				be available for public consultation in Q4'09. Increased surveillance of water production at all oil and gas wells with perforations above the BGWP was implemented with the release of ERCB Directive 44 (Oct. 31'06). AENV is advised of any shallow CBM wells that are producing water, and this surveillance process can be modified to any new threshold volume that is ultimately arrived at.	
3.3.2E	**AENV and the EUB should develop a 'decision tree' approach for reviewing CBM/NGC applications involving non-saline water production. This process should address the level of risk to aquifers and users by considering factors such as hydrogeological settings, existing users, salinity and expected volumes of water produced. The decision tree should be developed with stakeholder input and should:**				
3.3.2.1	Incorporate the threshold volume of produced non-saline water, below which the Code of Practice would apply (See Recommendation 3.3.1).	2008	behind schedule	A simplified regulatory process is currently being drafted that will incorporate the threshold volumes. Interim threshold values will be used for the draft simplified regulatory process until scientifically based rate is determined. The increased surveillance processes for water production at all oil and gas wells with perforations above the BGWP that was implemented with the release of ERCB Directive 44 (Oct. 31'06) can be modified to any new threshold volume, and may be used to assist the simplified regulatory process.	
3.3.2.2	Consider geographical areas where the risk to the quality or quantity of water supplies might be greater than in other areas.	2008	behind schedule	Water short areas identified through oilfield water injection study. AGS Ardley Project will identify high risk areas which will help inform policy on where requirements need to be more	

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				rigorous. A draft report is under review by ERCB and AENV and expected to be available for by the end of 2009.	
3.3.2.3	Ensure that applications for CBM wells that would produce volumes of non-saline water in excess of threshold volumes trigger accelerated aquifer studies.	2009	on schedule	Any water diversion already requires an aquifer study. Update of 2004 Guideline for CBM water diversion to be released with simplified regulatory process. No large CBM related non-saline groundwater diversions to date.	
3.3.2.4	Ensure appropriate compliance with the decision tree.	2008	complete	Activity to be coordinated with the ERCB production water surveillance. Directive 44 is in place.	
3.3.3	AENV's Guidelines for Groundwater Diversion for CBM Development (April 2004) should be enhanced and required for a single well or group of wells where non-saline water is present or anticipated.				
3.3.3.1	The guidelines should be reflected in the risk-based decision tree process.	2008	behind schedule	The updated Guideline will be released when the simplified regulatory process is implemented. Stakeholders will be consulted when a draft is available.	
3.3.3.2	To ensure consistency, minimum conditions for approvals should be standardized across the province with additional site-specific conditions possible.	2008	complete	Interim threshold value will be used to determine when an approval or licence under the *Water Act* is required. Site-specific conditions are considered in the current authorization process. All *Water Act* authorizations already have standardized minimum conditions.	
3.3.3.3	The components of the field-verified survey of all water sources should be reviewed to ensure their appropriateness and effectiveness with regard to the scale of the project.	2008	complete	Current guidelines require that field-verified survey radius be scaled according to potential impact of CBM project. Revised guidelines will incorporate Baseline Water Well Testing (BWWT) in conjunction field verified survey.	
3.3.3.4	A province-wide review of existing CBM wells should be undertaken to ensure all guidelines have been met.	ongoing	on schedule	ERCB surveillance and audit processes enhanced. Pending completion of simplified regulatory process. Monthly	

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				surveillance of water production at all CBM wells with perforations above the BGWP was implemented with the release of ERCB Directive 44 (Oct. 31'06). This ensures that any shallow CBM wells that are producing water are identified, and this surveillance process can be modified to any new threshold volume that is ultimately arrived at.	
3.3.5 E	**AENV and the EUB should work with stakeholders, including the environmental service industry, to develop standard procedures and reporting requirements for the sampling, analysis, and monitoring of both saline and non-saline water quality and quantity for CBM/NGC wells and potentially affected non-saline water wells. Quality assurance and quality control measures should be developed, as well as a range of tests, depending on the type of water being tested, including:**				
3.3.5.1	Testing for a variety of metals and other impurities, as well as total dissolved solids.	2007	complete	BWWT standard outlines sampling procedures for required for routine and other parameters for water wells. U of C reports for AENV water/gas sampling program outlines procedures used for various inorganic and organic parameters. Reports will be available on AENV Water for Life website in 2009.	
3.3.5.2	Testing for the presence of gas in water wells. The presence or lack of gas should be included on the water analysis report or file (See Section 3.6 for discussion on methane migration and release).	2007	complete	Protocol for gas sampling completed in Aug '06 by AENV under BWWT standard. Science Panel provided recommendations to government in '08. Report is available on AENV website at www.environment.alberta.ca/3430.html U of C literature review on gas sampling techniques is available on AENV's 'Water for Life' website.	
3.3.5.3	Non-saline water produced from coal seams should be tested for its intended use or to determine what it can be used for.	2008	complete	Testing policies and procedures are in place to ensure appropriate testing is undertaken. Insufficient volumes of non-saline water	

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				produced to date to be tested or used for consumptive purposes.	
3.3.6	AENV should develop a water well testing program as follows:				
3.3.6.1	CBM operators should be required to offer baseline testing (as described in 3.3.5) of all nearby water wells within a specified distance of a proposed CBM well to be completed above the Base of Groundwater Protection. (No consensus was reached on an appropriate distance or depth of completion.)	2006	complete 2006	Standard for Baseline Water-Well Testing for Coalbed Methane/Natural Gas in Coal Operations implemented by the ERCB - effective date May 1, '06. Science Panel reviewed Standard and provided recommendations to government in '08. Report is available on AENV website at www.environment.alberta.ca/3430.html. Standard will be revised based on Science Panel recommendations and consultant/laboratory feedback. A draft of proposed revisions will be distributed to stakeholders for comment. Data to be evaluated on an ongoing basis to assess and update the program.	Standard for Baseline Water-Well Testing for Coalbed Methane/Natural Gas in Coal Operations implemented by ERCB May 1, '06.
3.3.6.2	The information from the baseline testing should be filed by operators in an open, public registry to enhance understanding of Alberta's groundwater system.	ongoing	on schedule	Updated version of template for reporting released in Feb'09. Work on a publicly accessible system is continuing. An online tool is expected to be available by Q4 '09.	
3.3.6.3	A clear process to address water well complaints should be developed and communicated to water well owners, surface rights holders and other stakeholders.	2007	complete 2007 – with work ongoing	Complaint number (1-800-222-6514) is posted on the AENV website under "Emergency Numbers". Complaint process communicated in June '06 CBM public information sessions. Training of AENV staff on water well issues is on-going. Internal manual being developed by AENV to ensure consistency.	Environmental Hotline (1-800-222-6514) process to register complaints with AENV communicated to stakeholders in CBM public information sessions in spring 2006. Two water well training workshops for AENV and ERCB compliance staff were held in '08 and '09. Summary of CBM related complaints independently

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					reviewed by Alberta Research Council available on AENV 'Water for Life' website.
3.3.7	AENV and the ERCB should review drilling and completion practices for new and recompleted water and energy wells, ensuring regulations are appropriate for the purpose of the well. Topics to be addressed should include: drilling and completion fluids; well bore integrity/aquifer isolation; casing types; fracturing; and completions, etc. This review should include the drilling and abandonment of temporary water source wells.	2010	on schedule	The ERCB issued Directive 27 (Jan. 31'06) imposing constraints on shallow fracturing. Directive 27 was updated in August '09. Directive 08 on surface casing depth requirement is scheduled for an update by Q3, '09. The ERCB issued an update to Directive 36 (Feb.'06) to address non-toxic components. The ERCB initiated a one-year field surveillance program specific to CBM in the fall of '05 to monitor compliance to identify if there are other areas requiring short term reviews and change. Inspections showed consistent operational compliance with industry standards for both conventional gas and CBM development. A CBM control well system is in place to collect segregated data specific to production from coals. Temporary water source wells are regulated under the *Water Act* and wells are required to be reclaimed after use. AENV encourages conversion of energy wells to water wells to be supervised by a licensed water well driller.	
3.4.2 E	**The ERCB and AENV should, in cooperation with other organizations such as the ARC, investigate whether CBM drilling and completion practices such as using dugout water and untreated river water may**	2007	behind schedule	Included in 3.3.7 project. A third party report (microbiology and hydrogeology) is complete and is currently being reviewed by ERCB. Expected public release by Q3, '09. Previous reviews	

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	affect aquifers, and review regulations to determine whether changes are needed.			have shown no potential for impact.	
3.5.1	AENV and the ERCB, with stakeholder input, should: Review existing requirements for deep well disposal of non-saline produced water and consider alternatives, if appropriate. Establish criteria for the beneficial use of non-saline produced water. Develop guidelines, including a requirement for a beneficial use assessment for non-saline produced water, and include them in the decision-tree approval process. Revisit authorized diversions of non-saline groundwater for industrial use when CBM developments create new sources of water in the area.	2008	behind schedule	Two scoping studies were undertaken by AENV, Petroleum Technology Alliance Canada, Alberta Energy Research Institute and DOE, one on high total dissolved solids (TDS) (June '07 and one on low TDS (August '07). The report can be found on the web at www.ptac.org/etalk/dl/HighTDS.pdf and www.ptac.org/etalk/dl/LowTDS.pdf. Information to be presented to stakeholders in Q2/Q3'09 from the above studies and other information gathered regarding beneficial use of produced water. General beneficial use considerations to be included in revised CBM Groundwater Diversion Guidelines. Where appropriate, and having regard for waste management and environmental protection, applications will be considered by regulators for small scale tests of alternative uses for non-saline produced water.	
3.5.2	AENV and the ERCB, with stakeholder input, should establish criteria for the beneficial use of marginally saline produced water. AENV and the ERCB, with stakeholder input, should then develop guidelines, including a requirement for a beneficial use assessment for marginally saline produced water, and include them in the decision tree approval process.	2008	behind schedule	Two scoping studies were undertaken by AENV, PTAC, AERI and DOE, one on high TDS (June '07 and one on low TDS (August '07). The report can be found on the web at www.ptac.org/etalk/dl/HighTDS.pdf and www.ptac.org/etalk/dl/LowTDS.pdf. Information to be presented to stakeholders in Q2/Q3'09 from the above studies and other information	

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				gathered regarding beneficial use of produced water. General beneficial use considerations to be included in revised CBM Groundwater Diversion Guidelines.	
3.5.3	AENV, the ERCB, and Alberta Energy should work with the water producing and environmental services industries to promote the development of new technology or the application of existing technology that can take advantage of saline and marginally saline produced water.	Ongoing (Align with PTAC)	complete – ongoing commitment	PTAC has expanded its activities to study new technology and water conservation practices including a new water conservation committee co-chaired by the GoA. Water Innovation Forums held Jun '06, June '07 and June '08 with increasing attendance in each year. These forums raise the profile of produced water conservation and reuse as well as showcasing new produced water management technology and ideas. Report on Cost-Benefit Analysis of Treating Saline Groundwater (AMEC) completed in March '07. Promoting and encouraging use of available funding opportunities such as the Environment Enhancement fund to focus on produced water management technology, innovation and efficiency. ERCB uses its pilot project approvals to authorize and monitor applications to reduce the need for non-saline water in drilling, completions and other operations. Several small scale approvals have been issued.	
3.6.1 E	**AENV and the ERCB should work with industry to investigate the potential for methane migration or release to water wells as a result of CBM depressurization.**	2009	complete	AENV contracted a consultant to prepare a scientific report to provide background information on the potential for gas migration and other unintended effects of CBM development. The	

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				report is available on the AENV website at http://environment.gov.ab.ca/info/posting.asp?assetid=8172&searchtype=as. The AENV/ERCB joint response to the report is available on the AENV website at http://environment.gov.ab.ca/info/posting.asp?assetid=8176&searchtype=as. Provincial groundwater monitoring system has been enhanced. Additional information is being gathered (Directive 35 and Directive 44) to support a future study. Data to date does not show a provincial problem. AENV complaint response to water well complaints is being enhanced.	
3.6.2	Based on the results of the previous recommendation, AENV and the ERCB should implement appropriate prevention, monitoring, and mitigation measures to address methane migration or release, if necessary.	2010	on schedule	AENV complaint response to water well complaints being enhanced. Provincial groundwater monitoring system being enhanced. ERCB continues to review and enhance CBM well construction requirements.	
5.2.3**	AE, in consultation with stakeholders, should consider the use of appropriate fiscal tools to encourage the use of saline water from CBM development to replace non-saline water for enhanced oil recovery and other industrial uses.	2008	complete 2008	A scoping study "Produced Water Beneficial Re-Use – High TDS Waters" by AENV, PTAC, AERI and DOE was released in August' 07. The study found there is insufficient data regarding characterization of the produced water and that fiscal tools are not the appropriate mechanism at this time. After extensive consultation this conclusion was agreed to by the Royalty Review Panel.	The report can be found at www.ptac.org/etalk/dl/HighTDS.pdf
Enhancing information and knowledge					
3.2.1E	**The following actions should be undertaken in collaboration with stakeholders to improve the scientific information on the province's water resources:**				

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3.2.1.1	AENV should expand its current monitoring network and data management systems.	2007 & ongoing	complete – ongoing commitment	AENV has added 25 wells to the provincial Groundwater Observation Well Network (GOWN) since 2007, bringing the total number of sites up to 216. Of these, 16 of the added wells are in CBM areas. No expansion planned in 2009-10. AENV initiated a water and gas sampling program in 2007 and has sampled 116 GOWN wells up to Mar 2009, the majority being in CBM areas. Two sample trailers were built specifically for the program. Reports by U of C for 2006-07 and 2007-08 sampling programs will be available on AENV Water for Life website in Q2'09. Sampling of 30-40 wells per year to continue on an ongoing basis. The monitoring program will continue under 'Water for Life'.	
3.2.1.2	AENV should complete its inventory of groundwater in the province, beginning in areas that could experience intense CBM development.	2012	on schedule	AENV and the AGS have partnered on a long-term, provincial groundwater mapping program, starting first with the Edmonton – Calgary corridor. This work is scheduled to be completed in 2011/12. Long-term commitment and funding to the program is key to the partnership. ERCB issued Directive 43 (Nov. 1/06) requiring shallow logging which will provide additional information on shallow geology to assist mapping. Additional related work includes the AGS Ardley project which is designed to study the interface between the overlying Paskapoo formation and the Ardley and should contribute to a better	

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				understanding of risk from CBM development. The work has been completed and a draft report is being reviewed by the ERCB and AENV. The report will likely be ready for release by the end of '09. The mapping program will continue under 'Water for Life'.	
3.2.1.3	The ERCB and AGS should complete the Base of Groundwater Protection mapping project.	2007	complete 2007	The AGS has completed the updating of the BGWP database. ERCB Bulletin 2007-10 on the BGWP database, was posted on the ERCB website.	
3.2.1.4	AENV and the ERCB, with industry, should investigate the potential for unintended effects of CBM development on surrounding aquifers.	2011	on schedule	Provincial groundwater monitoring system is being enhanced to provide information on any regional groundwater impacts. The AGS Ardley project is reviewing the interface between the Paskapoo and Ardley formations and will contribute to a better understanding of risk from CBM development. A draft report is under review by ERCB and AENV and is expected to be released by the end of '09.	
3.2.1.5	AENV should identify and characterize areas where CBM approval requirements need to be more rigorous due to potential impacts on non-saline aquifers, other water bodies, and other water users. Maps of these areas should be made available to regulators, industry, and stakeholders.	ongoing	on schedule	Edmonton-Calgary Corridor mapping to be completed in 2011/12. AGS Ardley Project will address high risk situations which will help inform policy on where requirements need to be more rigorous. A draft report is under review by ERCB and AENV and is expected to be released by the end of '09. Water short areas have been identified through oilfield water injection study.	
3.2.1.6	Before drilling and production from a	2006	complete	Standard for BWWT for CBM	Standard may be revised based

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	potentially non-saline aquifer where water volumes are anticipated to be above a threshold limit, CBM operators should obtain baseline data; including gas and mineral content and other indicators of water quality, flow rate/yield, and water levels.		2006	operations implemented by the ERCB – effective May 1, '06. Protocol for gas sampling finalized in Aug '06.	on Science Panel recommendations (see 3.3.5). Requirements for collection of baseline data for non-saline water diversions will be specified in a simplified regulatory process (see 3.3.1).
5.2.1 non-consensus	Alberta Energy, in consultation with stakeholders, should determine an appropriate level of royalty reduction for a period of up to five years to encourage the drilling of saline CBM wells in the Mannville formation for the purposes of acquiring information.		not accepted		
5.2.2**	The Alberta and the federal governments should consider recognizing Canada's CBM potential through the adjustment of tax regimes, including corporate income tax and freehold mineral tax, to encourage a five year pilot-type drilling program for saline CBM wells in the Mannville formation for the purposes of acquiring information.		not accepted		
6.5.1	Alberta Energy should allow companies an additional one-year continuation under Section 17 of the Petroleum and Natural Gas Tenure Regulation. This additional year would require industry to submit evidence of work conducted during the first continuation period.	2010	complete 2007	Internal consultation completed. Extension history for CBM reviewed. Based on both the technical review and the lack of requests for more time outside current continuation legislation, there is no need for a second year under Section 17. P&NG Tenure Industry Advisory Committee agreed at their May 17, '07 meeting.	
7.4.1	The ERCB, AENV, and SRD should improve the coordination of their CBM related application and surveillance processes, and develop electronic solutions to facilitate data exchange.	2011	addressed under other broader government initiatives	Alignment of AENV and ERCB processes for baseline testing (coordinated standard and directive). Preliminary discussions on opportunities for data sharing commenced. AENV and ERCB signed	

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				a MOU in December '07 to further protect groundwater resources in Alberta. The Upstream Oil and Gas Policy Integration Project (UOGPIP) initiative is evaluating options to modify and align all processes in the oil and gas regulatory responsibility including data access. The UOGPIP is nearing the final stages and recommendations for regulatory change to streamline a number of aspects related to the oil and gas industry will be put forward to government. The Land-use Framework has made a commitment to "Support the establishment of a network connecting researchers, practitioners, institutions and programs to address strategic needs and priorities for the Land-use Framework." Work will continue through the LUF and the Regulatory Project.	
8.1.2	Regulators should review CBM activities in other jurisdictions to ensure Alberta gains the benefit of studies and experience elsewhere.	ongoing	complete	ERCB Directive 27 on shallow fracturing included a review of other jurisdictions. Gas migration report includes review of other jurisdictions with CBM. Additional reviews will be conducted on a topic basis.	
Minimizing Surface Impacts					
4.2.1	The ERCB, AENV, and SRD should review its regulatory process for ways to support minimal surface disturbance and reduced cumulative impact associated with CBM development.	2009	complete	Changes to ERCB regulations and Directive 065 regarding the management of commingled production in the wellbore were implemented in 2006 that assisted in reducing the number of future wellbores required to recover oil and gas resources.	

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				Activities completed in 4.3.1, and 7.2.1 address this recommendation.	
4.3.1 E	**To protect the environment and minimize the cumulative impacts from CBM development, a government-led multi-stakeholder committee, such as that being set up under SRD Integrated Land Management (ILM) Program, if appropriate, should undertake the following sequentially:** **1. Review integrated land management principles, policies, and practices relating to CBM to ensure they maintain the integrity and function of the land, taking into account all uses.** **2. Identify environmentally sensitive and threatened areas (including areas not already designated) that are not appropriate for CBM development.** **3. Recommend needed baseline studies to identify any areas where the integrated land management process may not adequately protect environmentally sensitive areas and make appropriate recommendations for the protection of these areas. Implementation in their process.** **4. Provide any such recommendations or data gathered from baseline studies to the appropriate existing program/group for consideration and/or implementation in their process.**	2011	addressed under other broader government initiatives	The ILM Program Plan is being implemented and linked to the Land-use Framework. The techniques and approaches used for the management of CBM development and regulatory approval in the pilot can be implemented province-wide and are directly transferrable to all CBM developments. The Fort Assiniboine area has been identified for this pilot. SRD, ERCB, Nexen, Trident and the local communities are applying integrated approaches to land management for CBM activities on public and private land. The full implementation of the ILM operational plan will occur over the upcoming year as it is completed in conjunction with the development of the Land-use Framework which was released in December 2008. The initiation of the Lower Athabasca Regional plan and associated Regional Advisory Council (RAC) has occurred along with initial scoping of the issues and areas of concern for the Southern Saskatchewan Plan has occurred. The RAC for the South Saskatchewan Regional Planning area was officially created in May 2009 and the planning process will start later in 2009. This recommendation will be addressed through broader government initiatives	

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				such as such as the LUF and ILM.	
4.3.2	Government and all relevant industries should work together to improve the science and technology for remediation and reclamation of the land in sensitive areas that could be impacted by CBM development.	2011	complete	An SRD sponsored study was completed by the U of C on foothills fescue reclamation. Implementation of study recommendations is being reviewed. Draft revised Forested Green Area Reclamation Criteria has been released for review and comments. The reclamation report is posted at http://www.srd.gov.ab.ca/lands/managingpublicland/rangemanagement/monitoringreferenceareas.as	

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				px A gap analysis for reclamation and re-vegetation issues for prairie landscapes has been completed. Recommendations from the work have led to the creation of the Foothills Restoration Forum Initiative to bring researchers and the public together to discuss native prairie use and restoration issues. A similar forum is being discussed by the Boreal Forest Research Centre. Boreal gap analysis was completed in Spring '08. A Draft '09 reclamation criteria (including the grassland, forested, cultivated and peatland land uses) was presented at a practitioners' workshop in Feb. '08. Field trials on the criteria were conducted in summer and fall '08 and implementation is expected to occur summer '09. Ongoing work will be undertaken by the Fescue Forum Initiative.	
7.2.1E	**The ERCB and AENV should work with stakeholders to review the application processes for intense CBM/NGC developments to enhance and promote project-based planning and disclosure. This would allow:** ♦ **Definition of intense project developments.** ♦ **Full project disclosure** ♦ **Improved community consultation.** ♦ **Enhanced impact assessment.** ♦ **Review of mitigation measures**	2010	complete	ERCB conducting a series of pilots with expanded consultation with community and industry in several locations. Reports on initial ERCB-led pilots on website. Next pilots may target more environmentally sensitive areas or wet coals. New format for SRD Area Operating Agreements has been developed and approvals are being issued under the new format. Further work is being done on risk management, quality assurance,	

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				and compliance. Process for electronic submission of monthly status reports currently being developed. ERCB has adopted the land pilots as a new tool to address unique land use problems.	
9.2.1	Industry, regulators, and other stakeholders should develop and communicate practices and procedures to deal quickly with short-term noise complaints that are not currently covered under the ERCB's Guide 38.	ongoing	complete-ongoing commitment	CAPP's NGC/CBM Best Practices, developed with stakeholder input, was distributed to MAC members and posted to CAPP's website and includes information on noise complaints. New BMP will be reviewed every few years to ensure practices are current and reflect any new issues.	
9.6.1	Industry should continue to consult with SRD in consideration of minimizing disturbance to wildlife habitat and scheduling activities to address critical wildlife periods.	ongoing	addressed under other broader government initiatives	SRD requirements for wildlife protection plans in certain situations remains. Consultation with SRD by industry on a project specific basis as well as development of guidelines to assist in reduction of disturbance is ongoing. SRD consults and develops guidelines on a continuous basis as part of their day to day operations. Ongoing work will be addressed through government initiatives such as Area Operating Agreement Enhancement and Development Operating Guidelines for Oil and Gas Activity.	
Communication and Consultation					
3.3.4	AENV should clarify and communicate the existing rules regarding how much drawdown is	2007	complete 2006	AENV has clarified drawdown rules at MAC meetings and at CBM info	

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	allowed during CBM/ depressurization in a confined, non-saline aquifer to ensure aquifer protection.			sessions in Spring '06. Drawdown requirements already considered in *Water Act* authorization reviews. The policy will be reiterated in the simplified regulatory process when it is released.	
3.4.1	The ERCB and AENV should communicate with CBM operators, drilling contractors, and water well drillers regarding current and future requirements to protect non-saline aquifers. Action should be taken if there is evidence that an existing well has not met AENV's updated Guidelines for Groundwater Diversion for CBM/NGC Development.	ongoing ongoing	complete 2007	ERCB Directive 27 summarized rules related to water protection. This stimulated numerous one-on-one discussions with companies to clarify requirements and confirm commitment to comply	
6.2.1	The Alberta Government should make Crown lessees, freehold owners, and industry aware of the risks and associated impacts of split-title ownership.	2006	complete 2006	Material posted to DOE's website on December 22, 2006. Link to document: http://www.energy.alberta.ca/NaturalGas/CBM_Pdfs/Split_Title_Mineral_Ownership.pdf	
6.2.2	The Alberta Government should set up a process to facilitate parties coming together to work toward resolution of split-title ownership issues.	2008	complete 2009	As part of the new royalty framework, a separate multi-stakeholder consultation process was established in 2009. An independent consultant met with stakeholders individually in February/March, held a group session in March to develop consensus-based recommendations. A consultation summary was sent to stakeholders in May.	
6.3.1	Alberta Energy should review and clarify the criteria for Section 18 Notices of Non-Productivity and aggressively serve these notices. Section 18 Notices on existing agreements should continue to be subject to	2010	complete 2007	The extension history for CBM was reviewed. Serving more Section 18 notices will not release shallow rights (which CBM producers requested.) Based on the technical review and the	

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	deeper rights reversion.			lack of requests for more time outside current continuation legislation, there is no need for a second year under Section 17. P&NG Tenure Industry Advisory Committee agreed at May 17, '07 meeting.	
7.3.1	The ERCB, AENV, and SRD, with stakeholder input, should review all guidelines that relate to public input opportunities and notification to ensure the guidelines are appropriate for CBM development.	2010	complete	ERCB Directive 35 was issued to expand information on potential impacts which supports reviews for notification. ERCB has adopted the land pilots as a new tool to address unique land use problems.	
7.5.1 E	**Industry, regulators, and other stakeholders should increase the opportunity for dialogue, education, and awareness of the public, surface and subsurface rights holders, leaseholders, and industry on the possible impacts resulting from CBM development, and how the use of the land will be affected.**	ongoing	addressed under other broader government initiatives	Increasing number of presentations are being made by regulators. CAPP's NGC/CBM Best Management Practices issued to MAC & posted to CAPP's website. AENV, ERCB, Farmers' Advocate & CSUG held public info sessions on groundwater & CBM in June '06. CSUG Conference Nov. '06 included sessions on stakeholder issues. Numerous industry reps. attended & participated in Synergy Alberta conference October '06 where stakeholder issues were discussed. CERI, CAPP, CSUG and AB Economic Development collaborated on "Socio-Economic Impact of Horseshoe Canyon CBM Development in Alberta" report, released and presented at CSUG conference. This recommendation will be addressed through broader government initiatives such as such as the LUF and ILM.	

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7.5.2	The ERCB and AENV should consolidate CBM/NGC data in a publicly accessible and user-friendly database that includes information on postings, wells (e.g., drill logs), applications and approvals, chemical analyses and water production rates, well location, coal formation, production intervals, and monitoring data. The availability of data should be subject to the normal provisions of confidentiality.	2012	complete-ongoing commitment	Several topic-specific programs have been enhanced for areas of interest to CBM and other types of shallow development including tenure ownership, BGWP, application registry and CBM well identification which, in turn, can facilitate use of other existing database systems. The annual listing of CBM wells has shifted to a monthly release in ERCB ST 109. Information packages continue to be available for landowners upon request. There will be ongoing work for consolidated data systems under the direction of 'Water for Life' and LUF.	
7.5.3	The ERCB should create an easy-to-understand public explanation for 'wells per section per pool' as it refers to CBM development.	2007	complete 2007	The ERCB included a well density clause in spacing/holding applications effective fall 2005 to avoid misunderstanding of the number of wells approved. FAQ was added to the Q & A's on the ERCB spacing initiative website.	Link to the FAQ: http://www.ercb.ca/portal/server.pt/gateway/PTARGS_0_240_2546397_0_0_18/
7.5.4	The ERCB and Municipal Affairs, along with other stakeholders, should clarify and communicate the requirements, roles, and responsibilities related to setbacks.	2012	on schedule	The ERCB is currently undertaking a review of setback requirements for sweet gas and sour gas facilities. Following the review the ERCB and Municipal Affairs will work with other stakeholders to determine appropriate methods of communicating the outcome of the review including requirements and roles and responsibilities of the various jurisdictions to stakeholders.	
7.5.5	Government and industry should continue to work with stakeholders to develop and implement a communication plan to provide Albertans with better information on CBM	2007 (and ongoing)	complete	AENV's Groundwater and CBM public information sessions conducted at 13 locations across Alberta in June '06. Public info Fact Sheets produced to	

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	issues, including potential effects on water supply.			coincide with sessions. AENV is working in partnership with organizations including Prairie Farm Rehabilitation Administration, Alberta Agriculture & Rural Development and various municipalities to provide rural Albertans with the knowledge and support they need to properly construct, site and maintain their water wells. The Working Well program has been very successful and is in high demand. Over 40 workshops have been delivered in rural communities across the province since 2008. More information available on Working Well website: www.environment.alberta.ca/3081.html. Work relating to this recommendation will continue under 'Water for Life'.	
7.6.1	As recommendations in this document are implemented, it is recommended a multi-stakeholder committee be established by the Assistant Deputy Ministers Sponsors' Committee to conduct a review with the following components: Annual reviews for three years to assess progress according to a monitoring plan. A second overall review in three years to assess: - The effectiveness of the recommendations, - New issues or information, and - An assessment as to whether additional recommendations may be needed.	2010	complete	Multi-stakeholder advisory committee established by Ministerial Order. First year meetings held Sept., Dec.'06 and Mar.' 07. MAC II agreed to minute objectives instead of Term of Reference. Report templates reviewed by MAC II. First public report released June '07. Second public report released May '08. Third year meetings were held Nov. '08 and May, '09. MAC II members didn't identify any concerns with effectiveness of the Final Report recommendations, raise any new issues or information, or identify any additional recommendations. Third public report released Nov. '09.	
8.1.1 E	**Industry, government, and other stakeholders should work together to**	2007	complete 2006	Second public report released July '08. Third year meetings held on Nov 6,	New BMP will be reviewed every few years to ensure

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	develop, document, and implement best practices for CBM operations.			2008 and May 21, 2009.	practices are current and reflect any new issues.
9.3.1	The ERCB should continue to take into consideration the timing request of the surface rights holder/leaseholder during critical agricultural periods and not call a hearing at those times.	2007	complete - ongoing commitment	ERCB commits to maintain its current practices.	
9.4.1	Alberta Energy should review the full range of paper to electronic options of notification and should work with local government and other agencies to provide current petroleum and natural gas sales data in a user-friendly format (including map format) to local and/or rural offices such as county offices, agricultural offices, and public libraries.	2008	complete	The DOE has developed an online mapping tool to display the results of the most recent P&NG sales and oil sands sales data. In addition, the mapping tool will also provide information on existing P&NG and oil sands agreements.	The mapping tool is found at http://www.energy.alberta.ca/. Scroll down and click on "People Services"→ On the "Interactive Maps" page, scroll down and click on "Sales Results Map". Summary and detailed user manuals are part of the online Help functionality.
9.4.2	Alberta Energy should provide instructions on its website on the process for conducting an information search by land or by mineral agreement.	2008	complete 2007	To make it easier for the public to find the information they need, Alberta Energy's website has been revised to include quick links from all web pages under the "Our Business" tab to search services, interactive maps and related manuals. In addition, a detailed, step-by-step instruction manual for interactive maps was updated March 2, 2007 and can be found on the website.	The links are found in the left hand menu under "Services" i.e. http://www.energy.alberta.ca/ → "Our Business" tab → "Services" menu item → "Searches" menu item http://www.energy.alberta.ca/ → "Our Business" tab → "Services" menu item → "Interactive Maps" menu item. If a person needs to have a search completed, the site includes information on how to contact Crown Land Data Support at http://www.energy.alberta.ca/OurBusiness/1069.asp .

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9.5.1	The Alberta Government, including Human Resources and Employment should expedite the industry initiative to improve the continuing education/certification of land agents, including periodic recertification, and if necessary, amend legislation to provide for same.	2011	on schedule	The Land Agents Licensing Regulation was amended on November 30 '07. The amendments include post secondary education entry requirements, improved licensing procedures, continuing competency and more stringent standards of conduct. CAPL's Professional Surface Land designation program is in place for its members. The Canadian Association of Geophysical Contractors (Alberta) applied under the Professions and Occupations Associations Registration Act for self regulation and this is still under review. If approved, the regulation would include the regulation of seismic permit agents. Review of the Land Agents Act is proposed to begin in 2010/11.	
9.7.1	The Government of Alberta should require Alberta Land Titles to ensure as much transparency of information as possible is included on certificates of title to mineral rights.	2007	reviewed - no action	Service Alberta advised that Land Titles Registry cannot require leaseholders to disclose lease terms and is not the vehicle to adjudicate or solve this issue.	
Other					
7.7.1	Appropriate government departments and agencies should have sufficient resources to be able to implement these recommendations effectively and efficiently.	ongoing	addressed under other broader government initiatives.	The government will continue to evaluate its staffing requirements as part of its ongoing business. For example, resources have been committed to undertake initiatives such as 'Water for Life', LUF, ILM and Provincial Energy Strategy.	

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